ZOOLOGY.—*Two new leeches (Hirudinea) in the collection of the United States National Museum.*[1] J. Percy Moore, University of Pennsylvania. (Communicated by Waldo L. Schmitt.)

The two leeches herein described are among lots submitted through the interest and kindness of Dr. Waldo L. Schmitt from the collections of the U. S. National Museum. The first, from Mexico, is of exceptional interest. The other species occurs in China and Burma.

Genus **Diestecostoma** Vaillant

Diestecostoma magna, n. sp.

Figs. 1–3

Material examined.—Type, U.S.N.M. no. 20642, Río de los Playas, head waters of Tonalá River between Veracruz and Chiapas, March 1–8, 1944, collected by M. W. Stirling; paratype, labeled "Tehuantepec," collected by F. E. Sumichrast.[2]

Diagnosis.—Size large and form robust with external characters of the genus. Eyes probably normally four pairs on somites III to VI (annuli 3, 4–5, 6, and 9). Total number of annuli (not counting prostomium) 200 or 201. Complete somites 12-annulate, all annuli of nearly equal size. I, II, III each 1-annulate, IV and V 2-annulate, VI 3-annulate, VII 4-annulate, VIII 7 or 8-annulate, IX and X 8-annulate, XI and XII 9-annulate, XIII 10- or 9-annulate XIV 11-annulate, XV–XXII 12-annulate, XXIII probably 10-annulate but may be 12-annulate, XXIV–XXVII together of 19 or 17 annuli. Male pore XI *b4/c9* (ann. 42/43 or 43/44), female pore XIII *c9/c10* (ann. 62/63), separated by 20 or 19 annuli. Anus 194/195 followed by 5 or 6 postanal annuli. Nephropores not seen on VIII or IX, 14 pairs on X to XXIII, first four separated by 9 annuli, fourth and fifth by 10, and the next nine by 12 annuli; last pair (seventeenth) united in a median ventral pore behind ann. 195. Color uniform dark slate above, paler below. Black in life (M. W. Stirling).

The three known species of the genus, namely, *D. octannulata*, *D. mexicana*, and *D. magna*, have complete somites respectively of 8, 10, and 12 annuli. Customarily this would promote generic separation, but in this case nothing would be gained thereby.

Description of type.—A stout leech (Fig. 1) of very firm texture and thick, muscular body walls; cylindroid throughout, little depressed but with venter somewhat flattened, tapered at the ends; in general shaped much like an earthworm and evidently adapted for burrowing. Measurements in millimeters: length 103, to male pore 19; widths, buccal ring 3.5, male 8.5, maximum (XIII, XXI) 10.3, anus *ca.* 9; depths at same points, 2.3, 7, 7, *ca* 5; sucker diameter 6.7. Head region small; lip partially retracted into mouth but when drawn out arched and as seen from below rather wedge-shaped; its dorsum distinctly annulated and areolated; constituted of a prostomial apical lobe not separated by a distinct furrow from the first annulus which forms somite I, following which are four annuli constituting somites II, III, and IV. Venter of lip with margins converging into the buccal chamber, divided by a deep median sulcus and three pairs of shallower furrows into eight flat, smooth ridges. Peristomium or buccal ring formed by the union ventrally of the two annuli (6 and 7) of V, deeply crenate on the margin and with slightly extended small lateral lobes which partially embrace the lateral ends of somite IV. Eyes (Fig. 2) small, not forming a regular arch, the four pairs of distinct pigment cups in two groups on somites III and IV (annuli 3 and 4–5), and V (annulus 6) and VI (annulus 9); besides these are two minute pigment spots, one on the right side of II cephalad of the first definitive eye and the other on VI *a2* mediad of the last right eye. Clitellar region somewhat thickened and at the anterior end of XIII forming one of the widest parts of the body, but its limits not defined externally. Male pore a minute opening in the furrow XI *b4/c9*,

[1] Received March 15, 1945.

[2] In his day Dr. Sumichrast was one of the most valued correspondents of the Smithsonian Institution. For many years he occupied himself with a close and critical study of the natural history of Mexico, and he collected there for the Institution from 1868 to 1876, giving special attention to the Isthmus of Tehuantepec, collecting principally in the states of Veracruz, Oaxaca, and Chiapas, as well as Mexico and Puebla. As Dr. Sumichrast's notebooks seem no longer to be available, it is not now possible to say where the paratype was actually collected.

FIG. 1.—*Diestecostoma magna*, n. sp., right lateral aspect of type; ×1½.

that is, between the fifth and sixth annuli of the somite or the total number of annuli 42/43; female pore at XIII *c8/c9* (annuli 62/63) or 20 annuli caudad of the male, a large orifice cutting into *c8*, which is somewhat reduced and at this point coalesced with *c7*. Anus a large opening with furrowed margins far forward (as in the Erpobdellidae) between annuli 194/195 (counted on left side or 192/193 on right) into which it cuts. Postanal annuli 6, making the total 201. Caudal sucker relatively small, directed ventrad, with a broad peduncle as in *Erpobdella;* the dorsum areolated as on the body in five irregular transverse rows; venter slightly cupped, finely granulated, more coarsely toward the periphery where the margin is thick and crenulate, no radiating ridges or furrows. Nephropores, 15 pairs actually seen, the last belonging to somite XXIV carried caudad to the ventral face of the sucker peduncle, where they are united in a large median pore behind annulus 195, the last annulus developed on the venter. Fourteen pairs are conspicuous pores situated on the caudal border in the ventral intermediate line of *b2* or the equivalent *c4* of every somite from X to XXIII inclusive, that is, on annuli numbered 31, 40, 49, 58, 68, 80, 92, 104, 116, 128, 140, 152, 164 (on left, 163 right), 176 (on left, 174 on right). On somite VIII there is no trace of nephropores, and on IX, while there are small notches at the points where they would be expected, no actual pores were detected. Probably they are transferred to the buccal ring as in *D. mexicana* (Baird), but this can be definitely determined only by means of sections. *Annulation* strongly developed, the furrows deep and on complete somites usually alternately deeper so that the annuli appear grouped in couples, presumably each of two tertiary annuli, but there is some irregularity. Each annulus divided on its dorsal half into usually 24 (up to 28) more or less quadrate areas which are prominently convex, resulting in a conspicuously pebbled surface, finely roughened by numerous minute sensory papillae mostly aggregated in a central group which becomes more elevated on annuli toward the caudal end. Areolae often arranged more or less regularly in longitudinal series continuing over several annuli but oftener staggered and interlocking, especially in the median field. Metameric sensillae not distinguished. On the shorter span of ventral half-annuli an equal number of smaller, smoother, flatter areas. With only the eyes on the head and the nephropores in the middle body region to serve as metameric criteria, the following is a tentative determination of the probable composition of the somites: I, which is scarcely separated from the prostomium, II and II each uniannulate; IV incompletely and V fully biannulate, the latter united ventrally to form the buccal ring; VI 3-annulate (8–10) complete both dorsally and ventrally. Four pairs of eyes on III to VI, a minute supplementary eye on the right side of II and one on VI. VII 4-annulate (11–14), *a1* slightly $>a2=b5=b6$. VIII 7-annulate (15–21) probably $b3=b4=b5$ slightly $>b1=b2=c11=c12$. IX 8-annulate (22–29) *b1* to $b4>c9$ to *c12*, in four pairs, possible nephropores on *b2*

(23). X 8-annulate (30–37), like IX but with first certain nephropores on *b2* (31). XI 9-annulate (38–46), three larger annuli in middle preceded by two and followed by four small ones, *b2* = *b3* = *b4* > *c1* = *c2* = *c9* to *c12;* nephropore *b2* (40), male pore *b4/c9* (42/43). XII 9-annulate (47–55) like XI but no male pore, nephropore *b2* (49). XIII 10-annulate (56–65) like XII except that *b4* is apparently divided into *c7* and *c8* making two slightly larger preceded by two and followed by six smaller annuli; female pore *c8/c9* (62/63), nephropore *b2* (58). XIV doubtfully 11-annulate (66–76) all tertiaries but *b2*, the third annulus; nephropore *b2* (68). XV–XXI (77–160) each 12-annulate with all tertiaries (*c1–c12*) developed and more or less distinctly arranged in pairs, nephropores on the fourth annulus, *c4* (every 12th annulus from 80 to 152). XXII 12-annulate (161–172) similar to foregoing except that owing to split, spiral, and conjoined annuli, especially in the region of *a1*, two large annuli on the right side replace four small ones on the left, resulting in asymmetry and a discrepancy in the count on the two sides for the remainder of the length; nephropore on left side normal, on fourth annulus (164), on right side far forward in the large third annulus (163). XXIII probably 10-annuate (173–182 left, 171–180 right), nephropore on fourth annulus (*c4* 176 or 174). Caudad of XXIII, counted as 10-annulate, are 19 annuli which constitute somites XXIV to XXVII inclusive, but there are no external criteria for determining their limits. Some annuli in the anal region are much larger dorsally and taper to little or behind 195 to nothing ventrally but this is due to the strong curvature ventrad. Color as preserved uniform dark slate above, paler below; according to Mr. Stirling black in life.

Description of the paratype.—The paratype was collected by Dr. Sumichrast (see footnote, page 261). When living it was probably almost as large as the type, but now it is more contracted and artifically more flattened and somewhat distorted. It measures in millimeters: length 78.2, to male pore 16; widths, buccal 2.5, male 7.5, maximum (middle of length) 12.2, anus 7.2, depths at same points 2.5, 6.5, 8.6, 4.5; diameter of sucker 6. Annulation and other characters agree with the type, but the areolation is largely smoothed out as a result of softening and abrasion of the surface due to long preservation. There are some minor differences. Eyes four pairs, arranged as in the type on somites III to VI, none detected on II and no supplementary eyes on VI. Male pore at XI *b4/c9* (annuli 43/44), the additional annulus being due to an extra pregenital one, apparently in VIII, which appears to have eight instead of seven as on the type, but this is compensated on XIII which is 9- instead of 10-annulate, with female pore at 62/63 (probably *b4/c9*) 19 annuli behind the male. Both genital pores are relaxed and large. Nephropores are

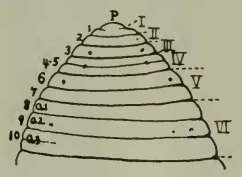

FIG. 2.—*D. magna:* type, segmentation of cephalic region from dorsum, semidiagrammatic; annuli numbered on left, somites on right side; *P*, prostomial lobe; ×5.

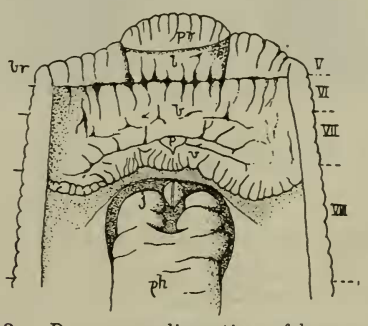

FIG. 3.—*D. magna*, dissection of buccopharyngial region of paratype, from the venter; *b*, buccal chamber laid open; *br*, buccal ring; *j*, right lateral jaw; *l*, lip; *p*, dorsal papilla; *ph*, pharynx; *pr*, prostomium; *v*, velum; somites numbered in Roman; ×6.

spaced exactly as on the type. None found on VIII and very doubtfully on IX but from X to XXIII they are evident, the first four being each separated by nine annuli, the fourth and fifth by 10, and the remaining nine pairs by 12 annuli, the last pair belonging to XXIV being united in a median opening at the base of the sucker. Anus at 194/195 followed by five annuli, making the total number 200. Owing to strong contraction the annuli for the most part are very narrow and crowded but on the dorsum are distinct and easily counted. In places, however, they are unequally contracted, and on the venter of the clitellar region are much split and interconnected.

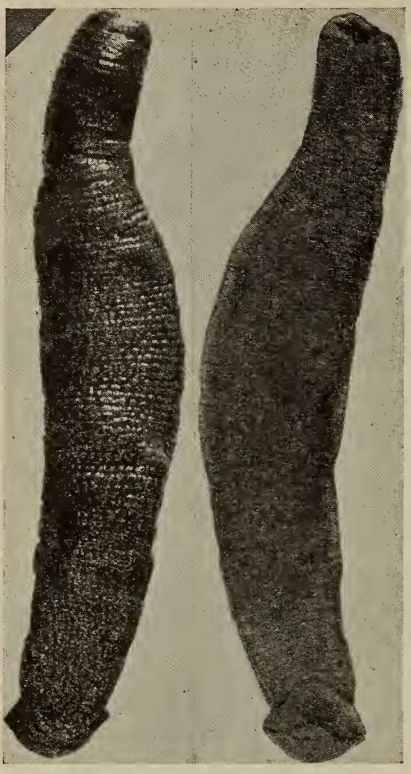

FIG. 4.—*Hirudinaria javanica similis*, n. subsp., dorsal and ventral views of type specimen; ×2.

Anatomy.—Neither specimen is suitable for complete anatomical study, and any dissection that might result in mutilation is prohibited because the specimens are unique. The pharyngobuccal region of the cotype was cautiously opened (Fig. 3), bringing to light conditions quite like those described by Cabellero (1940) for his *Hygrobdella pelaezi* = *Diestecostoma mexicana* (Baird, 1869) and in a forthcoming paper by the writer to be published by the Bishop Museum. The buccal chamber is spacious (Fig. 3*b*) and extends to the end of somite VII, where it is bounded by the velum (*v*). The inner surface is marked by a circular furrow, which delimits the buccal ring internally, and in its cephalic part by longitudinal furrows, some of which are continuations of those on the ventral face of the lip. These fade out in the caudal half where they are replaced by a few irregular, more or less branched wrinkles. The velum (*v*) is a prominent curtainlike diaphragm with deeply scalloped border forming the boundary between the buccal and pharyngeal chambers at VII/VIII. Immediately cephalad of it in the dorsomedian line is a soft triangular papilla (*p*) terminated by a short filiform process. The pharynx (*ph*) is a muscular organ lying in somite VIII and partly in IX. The cephalic end terminated by three lobes projects freely into an introverted pharyngeal chamber lined by a thin flexible membrane and obviously capable of limited protrusion somewhat as in the rhynchobdellid leeches but much less, although much more than in haemadipsines which show some approach to this condition. The three pharyngeal lobes are median dorsal and right and left ventral and each bears a small but prominent toothed jaw (*j*). Each jaw bears on a median ridge a series of teeth the form and number of which were not ascertained. On the type two ganglia of the ventral chain in complete somites XVII and XVIII were exposed through a cut that had been conveniently made at the time of collection. Relatively to the size of the leech they are small. As they lie in the two annuli immediately succeeding that on which the nephropores open they agree with the latter in fixing the position of the primary *a1* and *a2* components of complete somites. This, however, while helpful, does not certainly fix the limits of the somites which was done for the middle body region on the additional evidence supplied by the tendency of every alternate furrow to be somewhat deeper, thus uniting the tertiary annuli in pairs. The position of the nephropores in relation to the split annuli on somite XXII, as well as comparison of the 3 known species of the genus, also support the interpretation adopted herein. There are, however, two less probable interpretations than the one adopted in this paper. Until material for a complete anatomical study is available the exact interpretation of the annulation must remain uncertain.

Little is known of the life and habits of this leech. In a letter Mr. Stirling kindly writes that his specimen was found along with another of similar size in fairly dry earth a few inches beneath the surface while he was excavating a ball court in the forest. They impressed him as being black (probably dark slate color) and were dry and not covered with mucus, which is obviously true of the preserved specimen. The paratype must be at least 74 years old, as Francis Sumichrast made his collections in Tehuantepec in the late 1860's and early 1870's.

In *D. mexicana* (Baird), the genotype, the

first pair of nephropores, which in most leeches open on somite VIII, are carried forward by long ducts to open on the inner surface of the buccal ring, thus resembling the true land leeches (Haemadipsinae). In *D. mexicana*, also, there is evidence that the first and second pairs of nephridia are united and that the buccal outlet serves both. A similar condition in *D. magna* would explain the failure to find nephropores on both VIII and IX.

Genus **Hirudinaria** Whitman

Hirudinaria javanica similis, n. subsp.

Fig. 4

Material examined.—Four specimens, including the type (U.S.N.M. no. 20644). Collected at Yun Hsien, Yunnan Province, China, by W. L. Jellison, March 16, 1943. One specimen, labeled "Indian Museum, Z.E.V. 4871. Mainma Dist., N. Burma, Chinese frontier," collected by T. Rennie, June 10, 1911, from pool of water in which buffaloes wallow. This specimen was taken with a large number of *H. javanica javanica*, some of which had gonopores in intermediate positions.

Description.—Based upon these five specimens, this form is distinguished from typical *H. javanica* Wahlberg by the separation of the gonopores by nine instead of seven annuli, the male pore being at XI *a2/b5* (ann. 30/31) and the female at XIII *b2/a2* (39/40). In size, form, color pattern, annulation, arrangement of areolae, and other external characters there is complete agreement with typical *H. javanica*, but in a few respects, as in the position of the gonopores, this form seems to pass beyond the limits of variation of typical *javanica*. Among these is the number of sucker rays as counted at the margin, which is 53 or 54 in the specimens of *similis*, while 40 to 48 is most usual in *javanica*. However, this has little significance as some rays are entirely undivided, whereas others bifurcate two or even three times, the last division often appearing close to the periphery of the sucker. The sensillae appear to be relatively smaller but have the same distribution, elliptical form, and angular deviation from the body axis as in *javanica*. Two specimens dissected differ in respect to the female organs from those of *H. javanica* as described in *Fauna of British India—Hirudinea* (p. 217) in having much shorter oviducts and larger prostate glands. Other dissections of *H. javanica*, however, show variations in both respects partly bridging this gap. The salivary papillae on the jaws of one specimen studied are somewhat more numerous, there being on each side about 19 of the smaller size, mostly in a row close to the dentigerous ridge but a few on the jaw peduncle, and 15 of the larger scattered or in short irregular rows on the sides of the jaws. The former measure 0.029 to 0.037 mm and the latter 0.05 to 0.064 in a specimen of medium size.

The difference in the number of annuli separating the gonopores involves not one but two characters, as the positions of the male and female pores vary independently. In the collection of the Indian Museum are specimens of *H. javanica* in which either of these is shifted from the furrow somewhat into the bounding annuli (Moore, 1922, p. 212), the female pore tending to move to a more caudal, the male to a cephalic position, resulting in intermediates between the two subspecies.

Typical *H. javanica* is abundant in Assam and Burma, and present information indicates that in North Burma there is a tendency for the gonopores to separate more widely and that at the northward limit of the known distribution of the species in the Burmo-Chinese frontier area there is a population in which nine full annuli intervene.

The type of *H. j. similis* is an individual of medium size measuring, in millimeters: length 61, to male pore 13; widths, buccal ring 4.4, male 7, maximum (*ca.* XV) 11, anus 3.5; depths at same points *ca.* 3, 2.8, 3.5, 2.3; caudal sucker 7.

ICHTHYOLOGY.—Anchoviella analis, *a new engraulid fish from the west coast of Mexico.*[1]

Robert R. Miller, U. S. National Museum.

During the World's Columbian Exposition in Chicago in 1893, the Mexican Government exhibited representative fishes, mostly from the fresh waters of central and southern Mexico. The specimens were subsequently preserved and donated to the United States National Museum. Among

[1] Published by permission of the Secretary of the Smithsonian Institution. Received May 25, 1945.